



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/672,550	09/26/2003	Kaoru Uchida	17076	3731
23389 7590 06/12/2007 SCULLY SCOTT MURPHY & PRESSER, PC 400 GARDEN CITY PLAZA SUITE 300 GARDEN CITY, NY 11530			EXAMINER LIEW, ALEX KOK SOON	
			ART UNIT 2624	PAPER NUMBER
			MAIL DATE 06/12/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/672,550		UCHIDA, KAORU	
	<b>Examiner</b>		<b>Art Unit</b>	
	Alex Liew		2624	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 April 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3,6,7,12,14,17,18,23,25,28,29 and 34-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,6,7,12,14,17,18,23,25,28,29 and 34-42 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

The amendment filed on April 23, 2007 is entered and made of record.

### **Response to Applicant's Arguments**

1. On page 14, the applicant states: [Accordingly, Nakajima does not disclose the third step of authentication according to the results of the first and second step ...,] where the first step is collating features of the input data based on a fingerprint input by a user with features of enrolled data and second step of judging whether the input data are proper for authentication or not.

The examiner would like to clarify.

Bjorn (US pub no 2001/0040987) discloses capturing the images of the fingerprint (see figure ), but does not first step of collating input fingerprint image features to user with features of enrolled data. However, Nakajima (US pat no 6,094,499) discloses collating first step is collating features of the input data based on a fingerprint input by a user with features of enrolled data, shown on column 9 lines 18 – 27, and a step of authenticating the input data according to the first step, shown in figure 4 – 412. Bjorn's fingerprint input device modified by Nakajima's collating step disclose the first step of the claimed invention.

2. On page 15, the applicant states: [Bjorn does not disclose or suggest "a second step of judging whether the input data are proper for authentication, said second step

Art Unit: 2624

performed using a spatial frequency analysis of an input image represented by the input data ..."]

Bjorn discloses determination where the input is in position or not, shown in figure 5 – 510 to 520, by determining the level of energy present from the received light of the sensor plate. The fingerprint detecting device is modified the energy measurement by Nakajima, shown on column 9 lines 56 – 67, where A and B are amplitude spectrum values of the collating fingerprint images and Nakajima's Fourier image of window image of the fingerprint, disclose the second step of claim 1.

Bjorn discloses authentication step according to fingerprint input step and determination if the fingerprint is proper step, shown in figure 6A – 640. Bjorn combined with Nakajima disclose the claimed invention of claim 1.

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2624

2. Claims 1, 3, 6/1, 6/3, 12, 14, 17/12, 17/14, 23, 25, 28, 29/23, 29/25, 35/1, 35/3, 38/12, 38/14, 41/23 and 41/25 are rejected under U.S.C. 103(a) as being unpatentable over Bjorn ('987) in view of Nakajima ('499).

With regards to claim 1, Bjorn discloses a fingerprint authentication method comprising

- capturing fingerprint image (see figure 5 – 515),
- determining if the fingerprint image is positioned properly or not (see figure 5 – 520) and
- authentication step according to fingerprint input step and determination if the fingerprint is proper step (see figure 6A – 640).

Bjorn does not disclose collating step and taking Fourier energy measurement as discussed in the arguments. Nakajima discloses collating first step is collating features of the input data based on a fingerprint input by a user with features of enrolled data, shown on column 9 lines 18 – 27, and a step of authenticating the input data according to the first step, shown in figure 4 – 412. Bjorn's fingerprint input device modified by Nakajima's collating step discloses the first step of the claimed invention. One skill in the art would include a collating step because to unsure that the user claims who he / she said he / she is, to increase security of the system.

Also, Nakajima discloses a step of deciding a rectangular observation area on the input image (see figure 1A – the rectangular observation area is chosen to be surrounding the fingerprint image), a step of finding transformed image from the input image (see figure 1B and column 11 lines 35 – 38 – fingerprint image data in figure 1B is the Fourier

Art Unit: 2624

image data of the fingerprint image in figure 1A), a step of calculating feature values on the basis of plural frequency bands derived from the Fourier transformed image, said feature values representing features of the spatial frequency distribution of brightness of the input image (the Fourier transform of an image represents the magnitudes of the intensity / brightness at different levels of frequency) and deciding whether the input data are proper for authentication or not on the basis of the feature values, wherein said previous step is done by the use of variance of strength values corresponding to two predetermined spatial frequency bands in the Fourier transformed image (see equation 1 – A and B are amplitude values of the Fourier transformed fingerprint image, which represents the strengths of the image brightness frequency). One skill in the art would include a step of calculating energy of fingerprint image spectrum because to determine the range of ridges on the fingerprint are repeated by observing the amplitudes of the spectrum improving recognition of the fingerprint.

With regards to claim 3, an extension to the discussion to claim 1, Nakajima discloses a fingerprint authentication method as claimed in claim 1, wherein said calculating strength values is done by the use of one or more discriminant functions and corresponding discriminative coefficients which are previously calculated by the use of the discriminant functions, the discriminant functions being for finding a characteristic value according to the feature values (see figure column 9 lines 56 – 60. – B exp (j)  $\phi$  is the discriminative coefficients which are previously calculated, the registration

Art Unit: 2624

fingerprint is processed before the collating fingerprint, see also see figure 4 – 403 and 404) and Bjorn discloses whether the input fingerprint values are proper or not.

With regards to claim 6/1 and 6/3, an extension to the discussion to claim 1, Nakajima discloses a predetermined spatial frequency bands include two spatial frequencies corresponding to a generic period of ridges of a human fingerprint (the ridges on the human fingerprint occurs periodically, so in periodicity of the spatial domain signal, see figure 1A to figure 2B where is the Fourier representation of image figure 1A).

With regards to claim 12 see the rationale and rejection for claim 1.

With regards to claim 14 see the rationale and rejection for claim 3.

With regards to claims 17/12 and 17/14 see the rationale and rejection for claim 6/1.

With regards to claim 23 see the rationale and rejection for claim 1.

With regards to claim 25 see the rationale and rejection for claim 3.

With regards to claim 28 see the rationale and rejection for claim 6/1.

With regards to claims 29/23 and 29/25 see the rationale and rejection for claim 7/1.

With regards to claim 35/1, an extension to the arguments to claim 1, Nakajima discloses discriminant functions weight the feature values with the discriminative coefficients and add the weighted feature values to find the characteristic value (see figure 14 – 811 – the correlation value is used to find a matching value).

With regards to claims 35/3, 38/12, 38/14, 41/23 and 41/25 see the rationale and rejection for claim 35/1.

3. Claims 7/1, 7/3, 18/12, 18/14 are rejected under U.S.C. 103(a) as being unpatentable over Bjorn ('987) in view of Nakajima ('499) as applied to claim 1 or 3 further in view of Modl (US pat no 6,782,120).

With regards to claim 7/1, Bjorn and Nakajima disclose all the limitations discussed in claim 1, but do not disclose spatial frequency corresponding to a generic period of ridges of a periodic structure caused by sweat glands. Modl discloses spatial frequency includes a spatial frequency corresponding to a generic period of a periodic structure caused by sweat glands of a human finger (see column 4 lines 36 – 44 – the sweat pores are located on the sweat glands). One skill in the art would include structures of sweat glands on human finger because to add an addition feature, which can be use for identifying individual or image matching, to increase security.



Art Unit: 2624

With regards to claim 7/3 see the rationale and rejection for claim 7/1.

With regards to claims 18/12 and 18/14 see the rationale and rejection for claim 7/1.

4. Claims 34/1, 34/3, 37/12, 37/14, 40/23, and 40/25 are rejected under U.S.C. 103(a) as being unpatentable over Bjorn ('987) in view of Nakajima ('499) as applied to claim 1 or 3 further in view of Vajna (US pat no 6,330,347).

With regards to claim 34/1, Bjorn and Nakajima disclose all the limitations discussed in claim 1, do not disclose discriminant function and the corresponding discriminative coefficients are decided by learning using learning data sets of fingerprints. Vajna discloses discriminant function and the corresponding discriminative coefficients are decided by learning using learning data sets of fingerprints (see column 4 lines 14 – 26 – the learning is done in figure 2a – 10, then the Fourier Transform is taken to filter the image, in figure 2b the result is use to individual identification). One skill in the art would include learning process because to familiarizes the system with a set of fingerprints, so the system may be able to identify the individual being screen.

With regards to claims 34/3, 37/12, 37/14, 40/23, and 40/25, see the rationale and rejection for claim 34/1.

Art Unit: 2624

5. Claims 36/1, 36/3, 39/12, 39/14, 42/23, and 42/25 are rejected under U.S.C. 103(a) as being unpatentable over Bjorn ('987) in view of Nakajima ('499) as applied to claim 1 or 3 further in view of Kamei (US pat no 6,067,369).

With regards to claim 36/1, Bjorn and Nakajima disclose all the limitations discussed in claim 1, do not disclose each feature values is a difference / ratio between of values of the variance of the two predetermined spatial frequency bands. Kamei discloses each feature values is a difference / ratio between of values of the variance of the two predetermined spatial frequency bands (see figure 9 – 901 – the feature vector is generated through Fourier transform shown in fig 17, the distance is calculated using difference between a pair of points). One skill in the art would include step of difference calculation because compare difference values to determine the best match against the database shown in figure 9 – 903.

With regards to claims 36/3, 39/12, 39/14, 42/23, and 42/25, see the rationale and rejection for claim 36/1.

### **Conclusion**

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2624

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alex Liew whose telephone number is (571)272-8623.

The examiner can normally be reached on 9:30AM - 7:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on (571)272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2624

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

**Alex Liew**  
**AU2624**  
**5/29/07**



JOSEPH MANCUSO  
SUPERVISORY PATENT EXAMINER